Australian Bureau of Statistics

6102.0 - Labour Statistics: Concepts, Sources and Methods, 2001

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INTRODUCTION

30.1 The Wage Cost Index (WCI) provides a measure of change in the price of employee labour. It measures quarterly changes in the average wage and salary cost of a representative mix of employee jobs in the Australian labour market, unaffected by changes in the quality and quantity of work performed. Estimates are used in formulating industrial relations and wages policies, economic analysis and contract adjustment. The ABS has published estimates for the Wage Cost Index on a quarterly basis since December 1997.

SURVEY OUTPUT

30.2 Estimates are published quarterly in **Wage Cost Index, Australia** (Cat. no. 6345.0). More detailed data are available on request.

30.3 Four sets of chain Laspeyres indexes are compiled:

- total hourly rates of pay - excluding bonuses;

- ordinary time hourly rates of pay - excluding bonuses;

- total hourly rates of pay - including bonuses; and

- ordinary time hourly rates of pay - including bonuses.

30.4 Within each index set, separate indexes can be made available for various combinations of State/Territory, sector (private/public), broad industry and broad occupation.

30.5 Data are available on an original basis only. Seasonally adjusted and trend data may be published in the future.

30.6 Data are compiled according to the concepts and definitions outlined in Chapter 11.

SCOPE AND COVERAGE

30.7 For the first stage sample of businesses, the standard scope exclusions for ABS labour-related business surveys (outlined in Chapter 23) apply to this survey.

30.8 The scope of the second stage sample is restricted to civilian employee jobs for which payments were made during the survey reference period. Hence self-employment jobs (such as proprietors/partners of unincorporated businesses), and jobs for which payments were not made during the reference period (such as jobs held by persons on unpaid leave) are not in scope of

the survey. In addition, 'non-maintainable' jobs (i.e. jobs that are expected to be occupied for less than six months a year) are not in scope of the survey, as are jobs for which remuneration is not determined by the Australian labour market (e.g. working proprietors of small incorporated enterprises, and jobs where the pay is set in another country).

SURVEY METHODOLOGY

30.9 Information for the Wage Cost Index is collected each quarter from selected businesses using a mail-out/mail-back collection methodology.

30.10 The survey reference period is the last pay period ending on or before the third Friday of the mid month of the quarter, except for bonuses for which the reference period is the three month period ending on the third Friday of the mid month of the quarter,

30.11 A business is **initialised** to the survey in the first quarter that it is selected. Initialisation involves the business selecting a random sample of jobs and providing detailed pricing specifications for the selected jobs. The payments made to the employees in those jobs are also collected. Other qualitative information about the business relevant to the Wage Cost Index is also collected through telephone contact with the business. This information includes details about pay change mechanisms for jobs, details of any awards or agreements that are relevant to selected jobs, details of overtime provisions, and any additional information about jobs that have unusual pay or working arrangements. This additional information assists survey staff to understand the nature of pay changes as they occur, to ensure that only pure price changes are reflected in the index.

30.12 Although payments made to employees are collected at initialisation, these newly selected jobs do not contribute to the index until the following quarter. This ensures that only jobs that have pay details for both the current and previous quarters, and hence pay movement data, contribute to index compilation in the current quarter.

30.13 In subsequent quarters, businesses provide details of payments made to the job occupants in the reference period of that quarter. They also indicate whether there have been any pay changes for each job in the previous three months, and the reason for the pay change.

30.14 The ABS takes a number of steps to ensure that data from the same jobs are collected each quarter, and that any change in price for a job between quarters is a 'pure price' change. During the data collection period survey staff contact businesses by phone and question the business contact for clarification of information provided on the form. This contact with businesses enables survey staff to determine whether the price change for a job was a pure price change, or whether the change in the price resulted from other factors, such as a change in the pricing specification, changes in the characteristics of the job occupant, or a new occupant being in the job.

30.15 The ABS conducts a program of personal visits to businesses. These visits are prioritised, concentrating on businesses when they are first initialised into the survey or when the contact officer in the business changes, and businesses with complex remuneration arrangements. These visits assist businesses to better understand the concepts of the survey and help ensure the continuing effectiveness of pricing to constant quality in the Wage Cost Index.

30.16 Response rates for the 1999-2000 financial year averaged 99%.

30.17 Businesses which do not mail back their completed questionnaire within a reasonable period of time after the survey reference date are followed up by mail and then phone if

necessary.

SAMPLE DESIGN

30.18 A probability sample design is used. The sample of employee jobs is obtained using a stratified two stage selection.

30.19 The selection unit for the stage one selection is the Management Unit/State (MUS). The collection and reporting units used in the survey usually correspond to the selection unit. However, where the MUS unit is unable to provide information required for the survey, it may be split into a number of 'reporting units'.

30.20 Second stage sampling units (employee jobs) are selected using systematic sampling within the first stage units. For further information on statistical units used in ABS business surveys refer to Chapter 23.

STAGE ONE SELECTION

30.21 A probability sample of employing businesses (MUS units) is drawn from the ABS Business Register. The MUS units on the ABS Business Register are stratified into homogeneous groups and then a random sample is selected using synchronised sampling within panels, via the Rotating Panel Methodology. For further information, refer to paragraph 30.28. Variables used to stratify the survey frame are:

- State or Territory;

- sector - the public and private sectors are stratified separately;

- industry - within the private sector, industry stratification is based on ANZSIC division; within the public sector ANZSIC divisions are aggregated to form four broad industry groupings; and

- employment size - the ranges used vary between States and Territories, sectors and industries.

30.22 Some MUSs with large benchmark employment are selected with certainty.

30.23 Following their selection at stage one, some MUSs are disaggregated into 'reporting units'. In most cases, all reporting units for a selected MUS are included in the sample. However, for some large units a random sample of reporting units may be taken.

STAGE TWO SELECTION

30.24 In the second stage, MUSs selected in the first stage are asked to select a random sample of up to ten employee jobs from their payrolls using instructions provided by the ABS. For the second stage sample, the start and skip intervals provided to businesses are calculated to yield approximately 19,000 jobs.

SAMPLE SIZE AND ALLOCATION

Stage one allocation

30.25 Approximately 4,100 MUSs are selected in the first sampling stage to yield a live sample of approximately 3,500 MUSs.

Stage two allocation

30.26 For the second stage sample, the instructions provided to businesses to select their sample yield approximately 19,000 employee jobs.

SAMPLE RESELECTION

30.27 For effective and efficient ongoing index construction, it is important that a high proportion of the initial sample of businesses is retained in subsequent quarters, and that the same jobs within those businesses stay in the sample where possible. However, with annual reweighting of the index to ensure its continued relevance, it is also necessary to update or refresh the sample of businesses annually. The first sample refreshing for the survey occurred in the September quarter 1999. Refreshing the sample also allows the ABS to control the length of time that small businesses, in particular, are included in the sample. By controlling the length of time businesses are included in the survey, the ABS can ensure that the burden placed on businesses is kept to a minimum.

30.28 The sample selection methodology used to refresh the sample of businesses in the survey is referred to as the Rotating Panel Methodology. Under this methodology, the survey population is initially divided randomly into five equal panels. Sample refreshing is performed from within only one population panel for each annual update. All new businesses commencing operation between each annual refreshing are included in the next population panel to be refreshed, and therefore have a chance of being selected at the next annual update, ensuring that the index reflects changes to the population of businesses over time.

ESTIMATION

INDEX ESTIMATION

30.29 Data collected for the Wage Cost Index are used to derive hourly prices which are then weighted and aggregated to form index numbers, the output items of the Wage Cost Index. These index numbers are chain Laspeyres indexes, linked annually in the September quarter.

30.30 Index numbers are constructed from the hourly price (i.e. quality adjusted hourly rate of pay) of each selected job in both the current and previous quarters, standard hours for each job, the sampling weight of each job, and the wage and salary expenditure for each elementary aggregate.

30.31 Index numbers are calculated within a 'link', and the series based on the latest link is 'chained' to the previous series to form a continuous series with a reference base of September quarter 1997 = 100.0.

30.32 The main steps taken to calculate the indexes are as follows.

- Derive the hourly prices (i.e. quality adjusted hourly rates of pay) for each job from wage and salary data, bonus payments data and hours data, for both the current and previous quarters (note: there are four different hourly prices derived).

- Estimate the average price per hour for elementary aggregates, for current and previous quarters, as a weighted average of the hourly prices of each of the jobs contributing to the specific elementary aggregate. The weights are the total sampling weight and the standard hours for each job.

- Calculate the quarterly ratio (current/previous) of estimated price per hour for each elementary aggregate, by comparing the average price for the elementary aggregate between the current and previous quarters.

- Calculate the cumulative change in average hourly price for each elementary aggregate from the base quarter of the link (i.e. the most recent September quarter) to the current quarter, by multiplying together the successive quarterly price ratios.

- Calculate an index number for the link by combining the elementary aggregate indexes using expenditure weights. This index number is then chained to the index series based on previous links to form an index with a reference base of September quarter 1997 = 100.0.

NON-RESPONSE

30.33 Imputation in the Wage Cost Index falls broadly into two types - explicit and implicit imputation.

30.34 Explicit imputation involves (i) the creation of derived data at the job level for non-responding and refusal jobs, and (ii) the replacement of data provided by the respondent with derived data for unclean fully or partially responding jobs. Explicit imputation, when it occurs, is done automatically.

30.35 Implicit imputation occurs when there is insufficient information to enable unclean jobs to be explicitly imputed. In this case, the sampling weights of responding units (clean jobs, reporting units, or MUSs as the case may be) are increased **during estimation** to account for the ones that cannot be explicitly imputed. All unclean jobs in a non-initialisation quarter will either be explicitly or implicitly imputed.

OUTLIERS

30.36 Jobs are flagged as potential outliers if they exceed a certain tolerance level for their impact on State by sector and sector by industry indexes. This impact is calculated as the job's percentage contribution to the index movement. The flagged jobs are closely scrutinised to ensure that the data are correct and the movement is genuine. The responding unit to which that job belongs is also closely scrutinised to ensure that all jobs in the unit are 'clean', so that the potential outlier is not having an additional impact through imputation.

30.37 Graphical techniques are used to help assess how the potential outliers differ from other jobs. Graphs are produced of estimates reflecting the sample weights, for job movement and the job contribution to the index at the State by sector and sector by industry levels, relevant to the job in question. The reason for the job's wage movement will also be taken into account in deciding the 'atypical' nature of the job's wage change, and subject matter opinions on this will be sought.

NEW BUSINESS PROVISIONS

30.38 New Business Provisions are not applicable to the Wage Cost Index as they do not have a significant impact upon the calculation of quarterly price ratios.

TIME SERIES ESTIMATES

30.39 The Wage Cost Index is not yet seasonally adjusted as the collection has not been running for sufficient time to enable seasonality to be estimated with sufficient accuracy.

RELIABILITY OF THE ESTIMATES

30.40 Estimates from the survey are subject to both sampling and non-sampling error. To date, the ABS has not published any standard errors for the Wage Cost Index quarterly movements, as the series needs to be available for some time before reliable variance estimates can be produced.

30.41 However, as the sample for the Wage Cost Index has been selected using probability sampling, standard errors will be produced using statistical techniques, once data are available for a sufficient number of quarters. As the standard error will be an estimate itself, it too could be subject to some volatility. As a result, the ABS plans to publish smoothed relative standard errors as a measure of sampling error from the September quarter 2001.

30.42 Currently, the method for assessing the reliability of indexes has been based on the number of matched jobs (i.e. jobs for which data for both the current and previous quarters are available) contributing to each specific index, with indexes for various combinations of State, sector, industry or occupation being made available for release on this basis. Early analysis suggests that the number of matched jobs contributing to an index is closely linked with the relative standard error of the quarterly movement of the index.

DATA COMPARABILITY OVER TIME

30.43 The Wage Cost Index collection methodology has not changed since its inception in September quarter 1997.

FURTHER INFORMATION

30.44 For further details contact the Assistant Director, Labour Price Index on Perth (08) 9360 5913.

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